

Joshua C. Liu
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Remarks

Applicants' have elected to prosecute the invention of Group I, claims 1-45.

Claims 46-61 have been withdrawn without traverse. Upon entry of this amendment, claims 1-45 will be pending in the application.

Claim 1 has been amended to more clearly define that the cooling passages are located within the interior of the roll core. Claims 16 and 31 have been amended to recite that there is at least one inlet cooling passage and at least one outlet cooling passage located within the metal overlay that extend substantially parallel to the central longitudinal axis of the roll core. Claims 2-15, 17-30, and 32-45 remain unchanged. Claims 46-61 have been withdrawn.

Paragraph 59 of the Applicants' application supports the amendment to claim 1 by stating that "in another embodiment of the caster roll 10, the cooling passages 34 are formed in the roll core 12." Paragraph 75 states that "in FIGS. 16, the cooling passages 34 are now formed within the roll body 18 instead of the first metal overlay 14. Accordingly, the entire fluid flow path for the cooling water is located within the roll core 12." Further support for the amendment to claim 1 is found in paragraph 76 which states that "in general, the embodiment of the caster roll 10 shown in FIG. 16 is substantially similar to the embodiments of the caster roll 10 having discussed previously having one metal overlay (i.e., first metal overlay 14) and two or more metal overlays (i.e., first and second metal overlays 14, 16), except that the cooling passages 34 are now formed within the roll body 18 instead of in the first metal overlay 14. The cooling passages 34 and

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radial passages 30 are formed in the same manner as described previously, for example by drilling longitudinally into the roll body 18 to form the cooling passages 34 and radially into the roll body 18 to form the radial passages 30." As stated in paragraph 56 and as depicted in FIG. 5 of the Applicants' application, the roll body 18 is part of the roll core 12. Further support for the amendment to claim 1 is found in FIG. 16 which depicts the cooling passages 34 as being located within the interior of the roll body 18 of the roll core 12. Paragraph 11 states that "the roll core has a central longitudinal axis and defines a plurality of longitudinally extending cooling passages for conducting a cooling medium through the roll core to cool the roll during use."

The amendment to claims 16 and 31 are supported in paragraph 77 of the Applicants' application. Paragraph 77 states that "the cooling water then flows longitudinally the length of the first metal overlay 14 (or roll body 18) through the "inlet" or "supply" cooling passages 34. Once reaching the end of the respective inlet cooling passages 34, the now heated water flows back the length of the first metal overlay 14 (or roll body 18) through the respectively interconnected "outlet" or "return" cooling passages 34, which are in fluid communication with the outlet passages 28a, 28b through the "return" radial passages 30. In summary, the heated water flows back the length of the first metal overlay 14 (or roll body 18) through the outlet cooling passages 34 and into the return radial passages 30." Further support for the amendments to claims 16 and 31 are found FIGS. 2-4, 11-13 that show the cooling passages 34 extending substantially parallel to the central longitudinal axis of the roll core 12. Additional support for the

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amendments to claims 16 and 31 is found in paragraph 15 of the Applicants' application that states that "the metal overlay defines a plurality of cooling passages for conducting a cooling medium through the metal overlay to cool the roll during use. The cooling passages may extend substantially parallel to the central longitudinal axis of the roll core and longitudinally in the metal overlay, preferably substantially the entire length of the metal overlay." Because there is support for the amendments in both the drawings and the specification, no new matter issue is presented.

Summary of Rejections and Objections

Claims 1, 3-6, 8, 10-12, and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Laucner (U.S. Patent No. 4,944,342). Claims 16, 18-21, 23, 25-27, 29-31, 33-36, 38, 40-42, and 44-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Delassus et al. (U.S. Patent No. 5,839,501). Claims 2, 17, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laucner (as applied to Claim 2), or Delassus (as applied to claims 17 and 32) in view of Schroder et al. (U.S. Patent 5,902,685). Claims 7, 22, and 37 are rejected under 103(a) as being unpatentable over Laucner (as applied to claim 7) and Delassus (as applied to claims 22 and 37) in view of Jachowski et al. (U.S. Patent No. 4,844,747). Claims 9, 13, 24, 28, 39, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauener (as applied to claims 9 and 13) and Delassus (as applied to claims 24, 28, 39, and 43) in view of Hartz (U.S. Patent No. 5,598,633). Claims 31-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delassus.

Legal Precedent Regarding 35 U.S.C. §102

Before addressing the rejections under 35 U.S.C. § 102, the Applicants would like to respectfully address legal precedent regarding § 102. In *Minnesota Mining & Mfg. Co. v. Johnson & Johnson*, 976 F.2d 1559 (Fed.Cir.1992), the Court held that “under 35 U.S.C. § 102, anticipation of a patent claim must be proven by showing that each element of the claim in issue is found, either expressly or under principles of inherency, in a single prior art reference”. Furthermore, the Court in *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264 (Fed.Cir.1991) held that “to establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient”. Finally, in *Ex Parte Levy*, 17 USPQ2d 1461 (Bd. Pat. App. & Inter. 1990), the Board held that “in relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teaching of the applied prior art.”

Rejection of Claims 1, 3-6, 8, 10-12, 14-15 under 35 U.S.C. 102(b)

The Examiner has rejected claims 1, 3-6, 8, 10-12, and 14-15 under 35 U.S.C. 102(b) as being anticipated by the Lauener '342 patent. Specifically, the Examiner argues that Lauener discloses providing a cylindrical roll core having a central longitudinal axis; forming a plurality of longitudinally extending passages in the roll core proximate the surface of the roll core for conducting a cooling medium through the roll core to cool the roll during use; and forming a metal overlay (or "shell") on the roll core 8) thereby anticipating claim 1. As amended, Applicants' claim 1 recites "providing a cylindrical roll core having a central longitudinal axis; forming a plurality of longitudinally extending cooling passages within the interior of the roll core proximate to the surface of the roll core for conducting a cooling medium through the roll core to cool the roll during use; and forming at least one metal overlay on the roll core."

In contrast to Applicants' amended claim 1, the Lauener '342 patent discloses the cooling grooves are located on the exterior surface of the roll core. In column 3, lines 48-52, Lauener teaches "cooling channels 26 which run axially to the roller are recessed in shell surface 27 in the form of grooves in roller core 8 which are open to the exterior. When the roller is ready to operate, they are covered by the inner surface of the roller shell." As can be seen in FIGS. 2, 4, and 6-7, the cooling channels 26 are located on the exterior surface of the roller core 8. Claim 12 of the Lauener '342 patent recites "channel means formed in the surface of a roller core." Claim 1 and claim 8 of the Lauener '342 patent both recite a "first cooling channel means formed in the outer surface of said roller

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core" and a "second cooling channel means formed in the outer surface of said roller core." Claim 16 of the Lauener '342 patent recites "axial grooves in the surface of said roller core."

Unlike the exterior surface of the roll core in the Lauener '342 patent, the exterior surface of Applicants' roll core/roll body is smooth. In paragraph 58 of the Applicants' application it is stated that "the surface 31 of the roll body 18 is preferably free of grooves and channels, such as those that are generally found in prior art caster rolls. The first metal overlay 14 is formed on top of the relatively smooth surface 31 (i.e. free of grooves and channels) of the roll body 18." Because the Lauener '342 patent discloses providing a cylindrical roll core having a plurality of longitudinal running cooling grooves located on the exterior surface of the roll core as opposed to Applicant's amended claim 1 that recites providing a roll core having cooling passages located within the interior of the roll core, Applicants respectfully submit that claims 1, 3-6, 8, 10-12, and 14-15 are in condition for allowance.

The Examiner has rejected claims 3-6, 10-11, and 14-15 under 35 U.S.C. 102(b) as being anticipated by the Lauener '342 patent. Specifically, the Examiner argues that Lauener discloses forming cooling passages spaced regularly and parallel about the central longitudinal axis of the roll core; perpendicular cooling passages; and acute angle passages. The Examiner also argues that although Lauener does not explicitly disclose forming the holes by drilling, it is inherent that such holes/passages be formed in this manner since drilling is the only viable machining operation for producing holes/passages

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in dense roller cores. Claims 3-5 depend from claim 1. Claim 6 depends from claim 5, which depends from claim 1. Claim 10 depends from claim 8, which depends from claim 1. Claim 11 depends from claim 8, which depends from claim 1. Claims 14-15 depend from claim 12, which depends from claim 1. As amended, Applicants' claims 1 recites "providing a cylindrical roll core having a central longitudinal axis; forming a plurality of longitudinally extending cooling passages within the interior of the roll core proximate to the surface of the roll core for conducting a cooling medium through the roll core to cool the roll during use; and forming at least one metal overlay on the roll core."

As stated above in more detail, the Lauener '342 patent discloses the cooling grooves as being located on the surface of the roller core. Support for this configuration is found throughout the Lauener '342 patent in both the claims and the specification. Because the Lauener' 342 patent recites providing a roll core with cooling grooves located on the exterior surface of the roll core as opposed to Applicants' amended claim 1 that recites providing a roll core with cooling grooves that are located within the interior of the roll core, Applicants' respectfully submit that claims 3-6, 10-11, and 14-15 are in condition for allowance because the Lauener' 342 patent does not anticipate Applicants' invention under 35 U.S.C. 102(b).

The Examiner has rejected claims 8 and 12 as being anticipated by the Lauener '342 patent. Specifically, the Examiner argues that Lauener discloses the roll core defining a centrally located longitudinally extending inlet and outlet passages and forming a plurality of radially extending passages in the roll core to connect the cooling passages

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to the inlet and outlet passages. Claims 8 and 12 depend from claim 1. As amended, Applicants' claims 1 recites "providing a cylindrical roll core having a central longitudinal axis; forming a plurality of longitudinally extending cooling passages within the interior of the roll core proximate to the surface of the roll core for conducting a cooling medium through the roll core to cool the roll during use; and forming at least one metal overlay on the roll core."

As stated above in more detail, the Lauener '342 patent discloses the cooling grooves as being located on the exterior surface of the roller core. Support for this configuration is found throughout the Lauener '342 patent in both the claims and the specification. Because the Lauener' 342 patent recites providing a roll core with cooling grooves located on the exterior surface of the roll core as opposed to Applicants' amended claim 1 that recites providing a roll core with cooling grooves that are located within the interior of the roll core, Applicants' respectfully submit that claims 8 and 12 are in condition for allowance because the Lauener' 342 patent does not anticipate Applicants' invention under 35 U.S.C. 102(b).

Rejection of Claims 16, 18-21, 23, 25-27, 29-31, 33-36, 38, 40-42, and 44-45 under 35 U.S.C. 102(b)

The Examiner has rejected claims 16 and 31 as being anticipated by the Delassus '501 patent. Specifically, the Examiner argues that Delassus discloses providing a cylindrical core having a central longitudinal axis; forming an overlay on the roll core; and forming a plurality of longitudinally extending cooling passages in the overlay for conducting a cooling medium through the overlay to cool the roller. Additionally, the Examiner argues that the roller/overlay of Delassus is clearly capable of receiving additional layers of overlay if so desired. As amended, Applicants' claims 16 recites "providing a cylindrical roll core having a central longitudinal axis; forming a metal overlay on the roll core; and forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use." Amended claim 31 recites "providing a cylindrical roll core having a central longitudinal axis; forming a first metal overlay on the roll core; forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the first metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use; and forming at least one additional metal overlay on the first metal overlay."

Applicants' amended claims 16 and 31 recite that the overlay must have a plurality of inlet cooling passages and a plurality of outlet cooling passages. The inlet cooling passages are used exclusively to transport cool water through the overlay and the outlet

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cooling passages are used exclusively to transport heated cooling water from the overlay. Paragraph 77 of the Applicants' application, states that the inlet cooling passage carries cool water down the length of the overlay (i.e. through the length of overlay) and the outlet cooling passage carries heated water up the length of the overlay in the opposite direction. The heated water is then expelled from the metal overlay by flowing through the "return" radial passages that are in fluid communication with the outlet passages located in the overlay.

In contrast, FIGS. 1 and 2 of Delassus does not disclose, nor suggest, providing an overlay/sleeve that contains one passage that is used exclusively for delivering cool water through the sleeve and a second passage that is used exclusively to expel heated water from the sleeve. Rather, Delassus discloses only one passage that is used to deliver cool water through the sleeve and to expel the heated water from the sleeve. This flow path is described in the Delassus '501 patent in column 4, lines 63-65, which states that the "cooling channels 32...are connected at their ends to cooling-water feed and return channels 7,8." FIGS. 1 and 2 of the Delassus '501 patent show that the cooling channel 32 is connected at a first end with the cooling-water feed channel 7 and connected at a second end with the cooling-water return channel 8. This is in stark contrast to Applicants' amended claim 16 and 31 that recite forming a plurality of inlet cooling channels and outlet cooling channels in the overlay. Because the Delassus '501 patent does not disclose providing a roll core with a plurality of inlet cooling passages used exclusively for delivering cool water through the sleeve and a plurality of outlet passages

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that are used exclusively to expel heated water from the sleeve, Applicants' respectfully submit that claims 16 and 31 are in condition for allowance.

The Examiner has rejected claims 18-20, 23, 25-27, 29-30, 33-35, 38, 40-42, and 44-45 as being anticipated by the Delassus '501 patent. Specifically, the Examiner argues that Delassus discloses forming cooling passages in the overlay spaced regularly and parallel about the central longitudinal axis of the roll core; perpendicular cooling passages; and acute angle passages; and a centrally located inlet passage. The Examiner also argues that although Delassus does not explicitly disclose forming the holes by drilling, it is inherent that such holes/passages be formed in this manner since drilling is the only viable machining operation for producing holes/passages in dense roller cores. Claims 18-20, 23, and 27 depend from claim 16. Claims 25-26 depend from claim 23, which depend from claim 16. As amended, Applicants' claims 16 recites "providing a cylindrical roll core having a central longitudinal axis; forming a metal overlay on the roll core; and forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use." Claims 29-30 depend from claim 27, which depend from claim 16. Claims 33-35, 28, and 42 depend from claim 31. Claims 41 and 42 depend from claim 38, which depends from claim 31. Claims 44-45 depend from claim 42, which depends from claim 31. Amended claim 31 recites "providing a cylindrical roll core having a central longitudinal axis; forming a first metal overlay on the roll core; forming a plurality of longitudinally extending inlet cooling

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passages and a plurality of outlet cooling passages in the first metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use; and forming at least one additional metal overlay on the first metal overlay.”

As stated above in more detail, the Delassus ‘501 patent does not disclose, nor suggest, providing an overlay/sleeve that contains one passage that is used exclusively for delivering cool water through the sleeve and a second passage that is used exclusively to expel heated water from the sleeve. Rather, the Delassus ‘501 patent discloses only one passage that is used to deliver cool water through the sleeve and to expel the heated water from the sleeve. Delassus describes this flow path in column 4, lines 63-65, which states that the “cooling channels 32...are connected at their ends to cooling-water feed and return channels 7,8.” FIGS. 1 and 2 of the Delassus ‘501 patent show that the cooling channel 32 is connected at a first end with the cooling-water feed channel 7 and connected at a second end with the cooling-water return channel 8. Because the Delassus ‘501 patent does not disclose providing a roll core with a plurality of inlet cooling passages used exclusively for delivering cool water through the sleeve and a plurality of outlet passages that are used exclusively to expel heated water from the sleeve, Applicants’ respectfully submit that claims 18-20, 23, 25-27, 29-30, 33-35, 38, 40-42, and 44-45 are in condition for allowance.

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Legal Precedent Regarding 35 U.S.C. §103

Before addressing the rejections under 35 U.S.C. § 103, the Applicants would like to respectfully address legal precedent regarding §103. Under § 103, a patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 if the subject matter sought to be patented and the prior art are such that the subject matter as a whole *would have been obvious* at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C. § 103(a). The language “obvious at the time the invention was made” has been held by the Courts to mean that it is inappropriate for the Examiner to use “hindsight” in determining obviousness. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082 (Fed. Cir.1985). The Court in *In re Vaeck* held that “a proper analysis under § 103 requires, inter alia, consideration of two factors: (i) whether there is some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings and (ii) whether the prior art would have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. Both the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant’s disclosure”. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

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Rejection of Claims 2, 17, and 32 under 35 U.S.C. 103(a)

The Examiner has rejected claims 2, 17, and 32 under 35 U.S.C. 103(a) as being unpatentable over Lauener (as applied to claim 7) and Delassus (as applied to claims 17 and 32) in view of Schroder. Specifically, the Examiner argues that it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a metal overlay as disclosed by Lauener or Delassus, by arc welding as taught by Schroder.

Claim 2 depends from claim 1. As amended, Applicants' claim 1 recites "providing a cylindrical roll core having a central longitudinal axis; forming a plurality of longitudinally extending cooling passages within the interior of the roll core proximate to the surface of the roll core for conducting a cooling medium through the roll core to cool the roll during use; and forming at least one metal overlay on the roll core."

As stated in more detail in the "Rejection of Claims 1, 3-6, 8, 10-12, 14-15 under 35 U.S.C. 102(b)" section above, the Lauener '342 patent discloses the cooling grooves as being located on the exterior surface of the roll core. In column 3, lines 48-52, Lauener teaches "cooling channels 26 which run axially to the roller are recessed in shell surface 27 in the form of grooves in roller core 8 which are open to the exterior. When the roller is ready to operate, they are covered by the inner surface of the roller shell." As can be seen in FIGS. 2, 4, and 6-7, the cooling channels 26 are located on the exterior surface of the roller core 8. Claim 12 of the Lauener '342 patent recites "channel means formed in the surface of a roller core." Claim 1 and claim 8 of the Lauener '342 patent

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both recite a “first cooling channel means formed in the outer surface of said roller core” and a “second cooling channel means formed in the outer surface of said roller core.” Claim 16 of the Lauener ‘342 patent recites “axial grooves in the surface of said roller core.” Because the Lauener ‘342 patent discloses providing a cylindrical roll core having a plurality of longitudinal running cooling grooves located on the exterior surface of the roll core as opposed to Applicant’s amended claim 1 that recites providing a roll core having cooling passages located within the interior of the roll core, Applicants respectfully submit that claim 2 is in condition for allowance.

Claim 17 depends from claim 16. As amended, Applicants’ claims 16 recites “providing a cylindrical roll core having a central longitudinal axis; forming a metal overlay on the roll core; and forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use.”

Claim 32 depends from claim 31. Amended claim 31 recites “providing a cylindrical roll core having a central longitudinal axis; forming a first metal overlay on the roll core; forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the first metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use; and forming at least one additional metal overlay on the first metal overlay.”

As stated in more detail in the “Rejection of Claims 16, 18-21, 23, 25-27, 29-31, 33-36, 38, 40-42, and 44-45 under 35 U.S.C. 102(b)” section above, Delassus does not

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disclose, nor suggest, providing an overlay/sleeve that contains one passage that is used exclusively for delivering cool water through the sleeve and a second passage that is used exclusively to expel heated water from the sleeve. Rather, Delassus discloses only one passage that is used to deliver cool water through the sleeve and to expel the heated water from the sleeve. Because the Delassus '501 patent does not disclose providing a roll core with a plurality of inlet cooling passages used exclusively for delivering cool water through the sleeve and a plurality of outlet passages that are used exclusively to expel heated water from the sleeve, Applicants' respectfully submit that claims 17 and 32 are in condition for allowance.

Rejection of Claims 7, 22, and 37 under 35 U.S.C. 103(a)

The Examiner has rejected claims 7, 22, and 37 under 35 U.S.C. 103(a) as being unpatentable over Lauener (as applied to claim 7) and Delassus (as applied to claims 22 and 37) in view of Jachowski. Specifically, the Examiner argues that it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a roller as disclosed by Lauener or Delassus, and heat treating the roller as disclosed by Jachowski.

Claim 7 depends from claim 1. As amended, Applicants' claim 1 recites "providing a cylindrical roll core having a central longitudinal axis; forming a plurality of longitudinally extending cooling passages within the interior of the roll core proximate to

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the surface of the roll core for conducting a cooling medium through the roll core to cool the roll during use; and forming at least one metal overlay on the roll core.”

As stated in more detail in the “Rejection of Claims 1, 3-6, 8, 10-12, 14-15 under 35 U.S.C. 102(b)” section above, the Lauener ‘342 patent discloses the cooling grooves as being located on the exterior surface of the roll core. In column 3, lines 48-52, Lauener teaches “cooling channels 26 which run axially to the roller are recessed in shell surface 27 in the form of grooves in roller core 8 which are open to the exterior. When the roller is ready to operate, they are covered by the inner surface of the roller shell.” As can be seen in FIGS. 2, 4, and 6-7, the cooling channels 26 are located on the exterior surface of the roller core 8. Claim 12 of the Lauener ‘342 patent recites “channel means formed in the surface of a roller core.” Claim 1 and claim 8 of the Lauener ‘342 patent both recite a “first cooling channel means formed in the outer surface of said roller core” and a “second cooling channel means formed in the outer surface of said roller core.” Claim 16 of the Lauener ‘342 patent recites “axial grooves in the surface of said roller core.” Because the Lauener ‘342 patent discloses providing a cylindrical roll core having a plurality of longitudinal running cooling grooves located on the exterior surface of the roll core as opposed to Applicant’s amended claim 1 that recites providing a roll core having cooling passages located within the interior of the roll core, Applicants respectfully submit that claim 2 is in condition for allowance.

Claim 22 depends from claim 16. As amended, Applicants’ claims 16 recites “providing a cylindrical roll core having a central longitudinal axis; forming a metal

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overlay on the roll core; and forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use.”

Claim 37 depends from claim 31. Amended claim 31 recites “providing a cylindrical roll core having a central longitudinal axis; forming a first metal overlay on the roll core; forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the first metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use; and forming at least one additional metal overlay on the first metal overlay.”

As stated in more detail in the “Rejection of Claims 16, 18-21, 23, 25-27, 29-31, 33-36, 38, 40-42, and 44-45 under 35 U.S.C. 102(b)” section above, Delassus does not disclose, nor suggest, providing an overlay/sleeve that contains one passage that is used exclusively for delivering cool water through the sleeve and a second passage that is used exclusively to expel heated water from the sleeve. Rather, Delassus discloses only one passage that is used to deliver cool water through the sleeve and to expel the heated water from the sleeve. Because the Delassus ‘501 patent does not disclose providing a roll core with a plurality of inlet cooling passages used exclusively for delivering cool water through the sleeve and a plurality of outlet passages that are used exclusively to expel heated water from the sleeve, Applicants’ respectfully submit that claims 22 and 37 are in condition for allowance.

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Rejection of Claims 9, 13, 24, 28, 39, and 43 under 35 U.S.C. 103(a)

The Examiner has rejected claims 9, 13, 24, 28, 39, and 43 under 35 U.S.C. 103(a) as being unpatentable over Lauener (as applied to claim 2) and Delassus (as applied to claims 17 and 32) in view of Hartz. Specifically, the Examiner argues that it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a roll core as disclosed by Lauener or Delassus while plugging the channels prior to forming the overlay/shell as taught by Hartz.

Claim 9 depends from claim 8, which depends from claim 1. Claim 13 depends from claim 12, which depends from claim 1. As amended, Applicants' claim 1 recites "providing a cylindrical roll core having a central longitudinal axis; forming a plurality of longitudinally extending cooling passages within the interior of the roll core proximate to the surface of the roll core for conducting a cooling medium through the roll core to cool the roll during use; and forming at least one metal overlay on the roll core."

As stated in more detail in the "Rejection of Claims 1, 3-6, 8, 10-12, 14-15 under 35 U.S.C. 102(b)" section above, the Lauener '342 patent discloses the cooling grooves as being located on the exterior surface of the roll core. In column 3, lines 48-52, Lauener teaches "cooling channels 26 which run axially to the roller are recessed in shell surface 27 in the form of grooves in roller core 8 which are open to the exterior. When the roller is ready to operate, they are covered by the inner surface of the roller shell." As can be seen in FIGS. 2, 4, and 6-7, the cooling channels 26 are located on the exterior surface of the roller core 8. Claim 12 of the Lauener '342 patent recites "channel means formed in

the surface of a roller core.” Claim 1 and claim 8 of the Lauener ‘342 patent both recite a “first cooling channel means formed in the outer surface of said roller core” and a “second cooling channel means formed in the outer surface of said roller core.” Claim 16 of the Lauener ‘342 patent recites “axial grooves in the surface of said roller core.” Because the Lauener ‘342 patent discloses providing a cylindrical roll core having a plurality of longitudinal running cooling grooves located on the exterior surface of the roll core as opposed to Applicant’s amended claim 1 that recites providing a roll core having cooling passages located within the interior of the roll core, Applicants respectfully submit that claim 2 is in condition for allowance.

Claim 24 depends from claim 23, which depends from claim 16. Claim 28 depends from claim 17, which depends from claim 16. As amended, Applicants’ claims 16 recites “providing a cylindrical roll core having a central longitudinal axis; forming a metal overlay on the roll core; and forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use.”

Claim 39 depends from claim 38, which depends from claim 31. Claim 43 depends from claim 42, which depends from claim 31. Amended claim 31 recites “providing a cylindrical roll core having a central longitudinal axis; forming a first metal overlay on the roll core; forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the first metal overlay for

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conducting a cooling medium through the metal overlay to cool the roll during use; and forming at least one additional metal overlay on the first metal overlay.”

As stated in more detail in the “Rejection of Claims 16, 18-21, 23, 25-27, 29-31, 33-36, 38, 40-42, and 44-45 under 35 U.S.C. 102(b)” section above, Delassus does not disclose, nor suggest, providing an overlay/sleeve that contains one passage that is used exclusively for delivering cool water through the sleeve and a second passage that is used exclusively to expel heated water from the sleeve. Rather, Delassus discloses only one passage that is used to deliver cool water through the sleeve and to expel the heated water from the sleeve. Because the Delassus ‘501 patent does not disclose providing a roll core with a plurality of inlet cooling passages used exclusively for delivering cool water through the sleeve and a plurality of outlet passages that are used exclusively to expel heated water from the sleeve, Applicants’ respectfully submit that claims 24, 28, 39, and 43 are in condition for allowance.

Rejection of Claims 31-45 under 35 U.S.C. 103(a)

The Examiner has rejected claims 31-45 under 35 U.S.C. 103(a) as being unpatentable over Delassus. Specifically, the Examiner argues that it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the first overlay in order to enhance the rigidity/strength of the roller, so as to extend its service life. Claims 32-38 and 42 depend from claim 31. Claims 39-41 depend from claim 38, which depends from claim 31. Claims 43-45 depend from claim 42, which depends from claim 31.

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As amended, claim 31 recites "providing a cylindrical roll core having a central longitudinal axis; forming a first metal overlay on the roll core; forming a plurality of longitudinally extending inlet cooling passages and a plurality of outlet cooling passages in the first metal overlay for conducting a cooling medium through the metal overlay to cool the roll during use; and forming at least one additional metal overlay on the first metal overlay."

As stated in more detail in the "Rejection of Claims 16, 18-21, 23, 25-27, 29-31, 33-36, 38, 40-42, and 44-45 under 35 U.S.C. 102(b)" section above, Delassus does not disclose, nor suggest, providing an overlay/sleeve that contains one passage that is used exclusively for delivering cool water through the sleeve and a second passage that is used exclusively to expel heated water from the sleeve. Rather, Delassus discloses only one passage that is used to deliver cool water through the sleeve and to expel the heated water from the sleeve. Because the Delassus '501 patent does not disclose providing a roll core with a plurality of inlet cooling passages used exclusively for delivering cool water through the sleeve and a plurality of outlet passages that are used exclusively to expel heated water from the sleeve, Applicants' respectfully submit that claims 24, 28, 39, and 43 are in condition for allowance.

In view of the foregoing amendments and remarks, Applicants' respectfully submit that claims 1-45 are patentable over the cited references. Accordingly, an early notice of allowance of this application is respectfully requested.

Joshua C. Liu
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In the event that any outstanding matters remain in connection with this application, the Examiner is invited to telephone the undersigned at (724) 337-1221 to discuss such matters.

Respectfully submitted,

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PATENT TRADE-MARK OFFICE



Robert A. Diaz, Esq.
Attorney for Applicants
Reg. No. 55,109
Tele. No. 724-337-1221